



IN THE UNITED STATES PATENT & TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant : Wolfgang REMPE, et al.
Serial No. : 09/942,268
Filing Date : August 28, 2001
Title : PROCESS FOR FORMING TUBE-
SHAPED HOLLOW BODIES
MADE OF METAL

APPEAL
BRIEF

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Diane Elder February, 2004
Signature Date

Sir:

Appellants submit in triplicate the following Brief on Appeal in connection with
the above-identified patent application.

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I. REAL PARTY IN INTEREST

All rights in the present application are assigned to Hydro Aluminium Deutschland GmbH, a corporation organized under the laws of Germany and having a place of business at Ettore-Bugatti-Strasse 6-14, Germany. Hydro Aluminium Deutschland GmbH is the real party in interest.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to appellants, the appellants' legal representative, or the assignee which will directly affect, or be directly affected by, or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-13 have been cancelled.

Claims 14-21 are pending in the present application. Claims 14-21 were rejected in a Final Office Action dated June 17, 2003. The Final Office Action of June 17, 2003, has been appealed.

IV. STATUS OF AMENDMENTS

An Amendment After Final Action under 37 C.F.R. 1.116(b) was filed on or about September 17, 2003. This Amendment cancelled then-pending claims 6-13 and was entered by the Examiner. However, the final rejection of claims 14-21 was maintained according to an Advisory Action dated September 26, 2003.

V. SUMMARY OF THE INVENTION

The invention concerns a process for forming a tube-shaped hollow body made of metal. Spec., para. 001.¹ A slab-shaped semi-finished product is first shaped into a closed cross-sectional profile, and the opposite edges of the semi-finished product are welded together to produce a tube-shaped hollow body. Spec., para. 011. The tube-shaped hollow body is identified by numeral 10 in Fig. 1(a). The hollow body 10 is partially expanded by inserting a conical mandrel 12, which is driven axially into the hollow body 10. Spec., para. 019. The expanded hollow body 10' in Fig. 1(b), is then soft annealed at, e.g., 300°C. Expanded hollow body 10' is then placed in a die 14 as shown in Fig. 1(c). A medium 16 is poured into the hollow body and pressure is applied by the stamp 18 as shown in Fig. 1(c). This step of hydroforming causes the hollow body to take its final shape 10" as shown in Fig. 1(d). See also Spec., paras 022 and 023.

VI. ISSUES PRESENTED FOR REVIEW

1. Whether the final rejection of claims 14, 16, 18, and 20 under 35 U.S.C. 103(a) as being unpatentable over US 5,960,660 (Klaas et al., hereinafter US '660) in view of US 3,247,581 (Pellizzari, hereinafter US '581) should be reversed?

2. Whether the final rejection of claims 15, 17, 19, and 21 under 35 U.S.C. 103(a) as being unpatentable over US '660 in view of US '581, and further in view of US 6,260,401 (Tada, hereinafter US '401), should be reversed?

VII. ARGUMENT

In the Final Office Action of June 17, 2003, the Examiner rejected claims 14, 16, 18, and 20 under 35 U.S.C. 103(a) as being unpatentable over US '660 in view of US

¹ References are to the paragraph number in the Substituted Specification.

'581, and claims 15, 17, 19 and 21 under 35 U.S.C. 103(a) as being unpatentable over US '660, in view of US '581, and further in view of US '401. However, Appellants submit that the five steps recited in claim 14, the only independent claim now in the application, are not disclosed or suggested by the cited prior art.

Specifically, claim 14 claims a process for forming a tube-shaped hollow body.

This process comprises the following five steps:

- 1) shaping a slab-shaped semi-finished product into a closed cross-sectional profile;
- (2) welding opposing edges of the semi-finished product to produce the hollow body;
- (3) mechanically partially expanding the hollow body thereby changing the cross-sectional area of the hollow body;
- (4) soft annealing the hollow body after the mechanically partially expanding step; and
- (5) hydroforming the hollow body after the soft annealing step.

The Examiner asserted that claim 14 is obvious from US '660 when taken in view of US '581. In issuing this rejection, the Examiner asserted that US '660 discloses forming a tubular body by mechanical expansion using actuated dies (col. 3, line 58, to col. 4, line 2) followed by hydroforming to a final shape (col. 4, lines 26 to 28). See para. 4 of the Final Office Action dated June 17, 2003. Appellants respectfully disagree with this statement.

US '660 discloses a method for producing a hollow camshaft in a two step shaping process consisting of a pre-forming step and a finishing step. Widening of the tube-shaped hollow body is achieved by applying an internal high pressure in both steps. See col. 2, lines 23 to 42 of US '660. In fact, US '660 discloses that during the pre-

forming step, the material is axially pushed longitudinally inwards from opposite sides of each camshaft by a movable die to achieve the desired mass distribution of the camshaft. See col. 3, line 65, to col. 4, line 2. Thus, during the pre-forming step, mechanical shaping takes place only in the axial direction. Expansion in the radial direction is achieved in US '660 only by application of an internal high pressure suitable for widening the internal diameter of the shaft. See col. 2, lines 30-36.

Claim 14 requires **mechanically** partially expanding the hollow body thereby changing its cross-sectional area. This refers to the step illustrated in Fig. 1(a) where a conical mandrel 12 is inserted into hollow body 10, thereby “mechanically partially expanding the hollow body” to increase its cross-sectional and form hollow body 10'. This step is not disclosed or suggested by US '660 which only teaches expanding the internal diameter of the hollow shaft by “applying an internal high pressure suitable for widening the pipe section.” Col. 2, lines 30-31, of US '660.

The other prior art reference relied upon by the Examiner, US '581, also does not disclose or suggest a step of mechanically partially expanding a hollow body to increase its cross-sectional area. In US '581, the internal diameter of hollow body 26 is expanded by applying internal pressure. See, col. 2, lines 60-67, of U.S. '581. Thus, even when US '660 and US '581 are considered together, this limitation is not disclosed or suggested.

As there is no disclosure or suggestion in US '660 and US '581 to perform the step of mechanically partially expanding the hollow body thereby changing its cross-sectional area, claim 14 is not rendered unpatentable by these prior art references under 35 U.S.C. 103(a).

All of the other claims depend from claim 14 and incorporate this limitation by reference. Therefore, they too are not rendered unpatentable under 35 U.S.C. 103(a) for similar reasons.

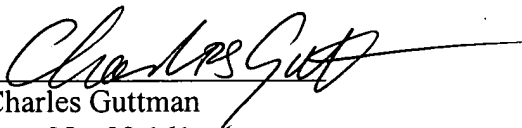
VIII. CONCLUSION

For the reasons stated above, it is requested that the final rejection of claims 14-21 under 35 U.S.C. 103(a) be reversed.

Respectfully submitted,
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Enclosure: Appendix of Claims in Appeal

X. APPENDIX OF CLAIMS ON APPEAL

Claims 1-13. (Cancelled)

Claim 14. A process for forming a tube-shaped hollow body, the process comprising:

shaping a slab-shaped semifinished product into a closed cross-sectional profile;
welding opposing edges of the semifinished product to produce the hollow body;
mechanically partially expanding the hollow body thereby changing the cross-sectional area of the hollow body;
soft annealing the hollow body after the mechanically partially expanding; and
hydroforming the hollow body after the soft annealing.

Claim 15. The process of claim 14 wherein the mechanically partially expanding and the soft annealing are performed multiple times in sequence.

Claim 16. The process of claim 14 further comprising soft annealing the hollow body before the mechanically partially expanding.

Claim 17. The process of claim 16 wherein the mechanically partially expanding and the soft annealing after the mechanically partially expanding are performed multiple times in sequence.

Claim 18. The process of claim 14 wherein when the hollow body has an initial cross-section and a cross-section after hydroforming, the mechanically partially expanding comprises expanding a portion of the hollow body in which the largest change between the initial cross-section and the cross-section after hydroforming is to occur.

Claim 19. The process of claim 18 wherein the mechanically partially expanding and the soft annealing are performed multiple times in sequence.

Claim 20. The process of claim 14 further comprising applying further processing to the hollow body; wherein:

when the applying comprises mechanical bending or mechanical shaping, the further processing is performed between the soft annealing and the hydroforming.

Claim 21. The process of claim 20 wherein the mechanically partially expanding and the soft annealing are performed multiple times in sequence.